

WHAT IS CLAIMED IS:

1. A suspension control apparatus for a vehicle comprising:
  - a vertical acceleration sensor for detecting a vertical acceleration of a vehicle; and
  - a control unit for determining a road surface profile by estimating wavelength and amplitude of irregularities of the road surface based on the vertical acceleration of the vehicle detected by said vertical acceleration sensor, and determining a suspension control value based on said road surface profile.
2. The suspension control apparatus for a vehicle according to claim 1, wherein said control unit estimates the wavelength and amplitude of the irregularities of the road surface further based on the vehicle speed and the weight of the vehicle.
3. The suspension control apparatus for a vehicle according to claim 1, wherein said control unit changes said suspension control value to a value suitable for a rough road section before said vehicle has entered the rough road section.
4. The suspension control apparatus for a vehicle according to claim 3, wherein said control unit changes said suspension control value from the value suitable for the rough road section after said vehicle has passed out of the rough road section.
5. The suspension control apparatus for a vehicle according to claim 3, wherein said control unit changes said suspension control value to a value suitable for a road section causing a vibration

level greater than that produced by the rough road section the vehicle is currently traveling and before the vehicle has entered the section causing the greater vibration level.

6. The suspension control apparatus for a vehicle according to claim 5, wherein said control unit changes said suspension control value from the value suitable for the section causing the greater vibration level when said vehicle is traveling a rough road section after the vehicle has passed out of the section causing the greater vibration level.

7. The suspension control apparatus for a vehicle according to claim 1, wherein said control unit controls suspension of the vehicle by controlling a damping force or a spring rate.

8. A suspension control apparatus for a vehicle comprising:

- a vertical acceleration sensor for detecting a vertical acceleration of the vehicle;

- a vehicle speed sensor for detecting a vehicle speed;

- a weight sensor for detecting a vehicle weight; and

- a control unit for determining a road surface profile by estimating wavelength and amplitude of irregularities of a road surface based on the vertical acceleration of the vehicle detected by said vertical acceleration sensor, the vehicle speed detected by said vehicle speed sensor and the vehicle weight detected by said weight sensor, and for determining a suspension control value based on said road surface profile.

9. The suspension control apparatus for a vehicle according to claim 8, further comprising:

- current position detecting means for detecting a current position of the vehicle,

wherein said control unit learns said road surface profile, and controls the suspension based on the learned road surface profile ahead of the current position of the vehicle.

10. The suspension control apparatus of a vehicle according to claim 8, wherein said control unit changes said suspension control value to a value suitable for a rough road section before the vehicle has entered the rough road section.

11. The suspension control apparatus of a vehicle according to claim 10, wherein said control unit changes said suspension control value from the value suitable for the rough road section after the vehicle has passed out of the rough road section.

12. The suspension control apparatus of a vehicle according to claim 10, wherein said control unit changes said suspension control value to a value suitable for a section causing a greater level of vibration than the rough road section, when the vehicle is traveling on the rough road section and before the vehicle has entered the section causing the greater vibration level.

13. The suspension control apparatus of a vehicle according to claim 12, wherein said control unit changes said suspension control value from the value suitable for the section causing the greater vibration level when the vehicle is under traveling on a rough road section after said vehicle has passed out of the section causing the greater vibration level.

14. The suspension control apparatus of a vehicle according to claim 8, wherein said control unit controls suspension of the vehicle by controlling a damping force or a spring rate.

15. A suspension control apparatus for a vehicle comprising:

current position detecting means for detecting a current position of the vehicle;  
communication means for receiving a road surface profile of a registered road section from an information providing server; and  
a control unit for determining a suspension control value based on the road surface profile received by said communication means.

16. A suspension control method for a vehicle comprising:

detecting a vertical acceleration of the vehicle;  
determining a road surface profile by estimating wavelength and amplitude of irregularities of a road surface based on the detected acceleration of the vehicle in the vertical direction; and  
determining a suspension control value based on said road surface profile.

17. A suspension control method for a vehicle comprising:

detecting a vertical acceleration of the vehicle;  
detecting the vehicle speed;  
detecting the vehicle weight; and  
determining a road surface profile by estimating wavelength and amplitude of irregularities of the road surface based on the detected vertical acceleration, the detected vehicle speed and the detected vehicle weight, and  
determining a suspension control value based on said road surface profile.